3. Upon quenching from $T_A$ the situation obtaining at $T_D$ is "frozen"; therefore, at the lower temperature $T_A$, the catalyst retains a large fraction of $n_a \tilde{n}(a)$ and, consequently, exhibits an activity larger than its true value at $T_A$ (proportional to $n_a \tilde{n}(a)$).

4. Eventually, at $T_A$, all the excess vacancies diffuse out via dislocations and the pits are restored to their original dimensions and the catalyst, to its original activity ($a_I \rightarrow a_p$). The decay process may, therefore, be likened to the 'healing of a scratch' or other time-dependent recovery processes.

5. At $T_D > 678^\circ K$ there is a drastic and, perhaps, irreversible reduction in $n_a$ and, therefore, of the catalytic activity.

This model, on the one hand, is able to explain adequately, though qualitatively, the activity of cold-worked metal catalysts and the effect thereof of annealing at various temperatures, while on the other, it can account for the failure of Bagg et al. to experimentally detect one to one correspondence between $n_a$ (instead of $n_a \tilde{n}$) and the catalytic activity.

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SYNTHESIS OF EUPATORIUM COELESTINUM FLAVONE

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Constitution assigned to a new flavone isolated from Eupatorium coelestinum as 5, 6, 7, 8, 3', 4', 5'-heptamethoxyflavone (I) has been now confirmed by its synthesis,

A new heptamethoxyflavone (C$_{16}$H$_{26}$O$_{7}$, m.p. 192$^\circ$) isolated from Eupatorium coelestinum, on the basis of colour reactions and spectral data, was proposed to have the constitution as 5, 6, 7, 8, 3', 4', 5'-heptamethoxyflavone (I). This communication confirms the proposed structure by synthesis. The flavone (I) has been now obtained using 2-(3', 4', 5'-trimethoxy)benzoyloxycarbonyl, 4, 5, 6-tetramethoxyacetophenone (III) prepared by the esterification of 2-hydroxyflavone, 4, 5, 6-tetramethoxyacetophenone (II) with tri-o-methyglalloxy chloride in the presence of pyridine. The ester (III) underwent Nair-Katsaros migration to yield 2-hydroxy-3, 4, 5, 6, 3', 4', 5'-heptamethoxydibenzylmethane (IV) which on cyclodehydration gave 5, 6, 7, 8, 3', 4', 5'-heptamethoxyflavone (I).

The flavone (I) has also been obtained by another method using 2'-hydroxy-3, 4, 5, 3', 4', 5', 6'-heptamethoxyflavone (V) which itself was obtained from 2-hydroxy-3, 4, 5, 6-tetramethoxyacetophenone (II)
and tri-o-methylgallaldehyde. Selenium dioxide oxidation of the chalcone (V) yielded 5, 6, 7, 8, 3', 4', 5'-heptamethoxyflavone (I). The synthetic flavone (I) was identical in properties with those recorded for the flavone isolated from Eupatorium coelestinum thereby confirming its proposed constitution.

Experimental

2-(3', 4', 5'-Trimethoxy) benzoyl-3, 4, 5, 6-tetramethoxyacetophenone (III): A mixture of 2-hydroxy-3, 4, 5, 6-tetramethoxyacetophenone (II) (2 g), tri-o-methylgalloyl chloride (2.5 g) and dry pyridine (15 ml) was heated at 100° for 1 hr. The ester (III) was extracted with ether and purified. On removal of the solvent, III was obtained as a liquid (1.8 g) which did not solidify and hence was used as such (Found: C, 58.5; H, 5.5. C₁₉H₂₀O₆ requires C, 58.66; H, 5.82%).

NMR (δ, CDCl₃, TMS as internal standard): 2.48 (3H, s, -OCH₃), 3.84 (3H, s, -OCH₃), 3.94 (12H, s, 4X -OCH₃), 3.98 (6H, s, 2X -OCH₃), 7.44 (2H, s, C₁ - H and C₁' - H).

2-Hydroxy-3, 4, 5, 6, 3', 4', 5'-heptamethoxyphenylmethane (IV): The above ester (III) (1.5 g), powdered potassium hydroxide (2 g) and pyridine (20 ml) were thoroughly shaken at 80° for 1 hr. The β-diketone (IV) (1.3 g) that was worked up as usual, but it did not solidify and was thus used as such after purification (Found: C, 58.5; H, 5.7. C₁₉H₂₀O₆ requires C, 58.66; H, 5.82%). It dissolved in aqueous sodium hydroxide (10%) and gave an olive-green colouration with alcoholic ferric chloride.

5, 6, 7, 8, 3', 4', 5'-Heptamethoxyflavone (I): The above β-diketone (IV) (1 g); fused sodium acetate (1.2 g) and glacial acetic acid (5 ml) were refluxed for 3 hr. The flavone (I) thus obtained, crystallised from chloroform-petroleum ether as colourless needles (0.8 g), m.p. 104-5° (Found: C, 60.9; H, 5.9. C₁₉H₂₀O₆ requires C, 61.10; H, 5.59%).

IR (KBr, cm⁻¹): 1630 (conj. ketone), 1580, 1500 (aromatic).

NMR (δ, CDCl₃, TMS as internal standard): 3.92 (3H, s, -OCH₃), 3.95 (12H, s, 4X -OCH₃), 4.61 (3H, s, -OCH₃), 4.08 (12H, s, -OCH₃), 6.60 (11H, s, C₁ - H), 7.12 (2H, s, C₁' - H and C₁'' - H).

2'-Hydroxy-3, 4, 5, 3', 4', 5', 6'-heptamethoxy-chalcone (V): A solution of 2-hydroxy-3, 4, 5, 6-tetramethoxyacetophenone (II) (1 g) and 3, 4, 5-trimethoxybenzaldehyde (1.5 g) in ethanol (10 ml) was treated with aqueous-ethanolic potassium hydroxide (1.2 g) at room temperature for 48 hr. The chalcone (V) thus obtained did not solidify and was used as such after purification (1.1 g) (Found: C, 60.6; H, 5.9. C₂₂H₂₀O₆ requires C, 60.82; H, 6.03%). It gave brown ferric reaction.

NMR (δ, CDCl₃, TMS as internal standard): 3.80 (3H, s, -OCH₃), 3.87 (9H, s, 3X -OCH₃), 3.90 (9H, s, 3X -OCH₃), 6.76 (2H, s, C₁ - H and C₁' - H), 7.76 (2H, s, Cα-H and Cβ-H).

5, 6, 7, 8, 3', 4', 5'-Heptamethoxyflavone (I): A mixture of the above chalcone (V) (0.8 g), selenium dioxide (0.5 g) and iso-amyl alcohol (20 ml) was refluxed for 72 hr and the reaction product was worked out as usual. The flavone (I) thus obtained, crystallised from chloroform-petroleum ether as colourless needles (0.5 g), m.p. 104-5°. It agreed with the synthetic sample obtained by the earlier method.

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PASSIVE BACTERIAL AGGLUTINATION FOR THE DETECTION OF HEPATITIS B VIRUS SURFACE ANTIGEN

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The detection of hepatitis B surface antigen (HBsAg) has become very important in clinical practice, blood bank service, and epidemiological studies. Most laboratories in India use counterimmunoelectrophoresis (CIE) for this purpose. This technique is simple and highly specific but only moderately sensitive. There are three methods with high sensitivity available currently, namely radioimmunoadsays, enzyme linked immunosorbent assay and reversed passive haemagglutination. Although research laboratories are importing reagents and using these methods, they are highly expensive and exacting to be recommended for routine use in hospital-based clinical laboratories.

Therefore we have developed a simple, rapid, specific and